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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/748,277 12/31/2003 Tac-wan Kim 249/409 6602

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EXAMINER

ALEJANDRO MULERO, LUZ L

ART UNIT

PAPER NUMBER

1763

MAIL DATE

DELIVERY MODE

07/25/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/748,277

Applicant(s)

KIM ET AL.

Examiner

Luz L. Alejandro

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,5,8-12,14,15 and 18-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2,4-5, 8-12,14-15 and 18-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4, 11-12, 14, and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., WO 00/00993.

Chen et al. shows the invention as claimed including an inductively coupled antenna 600 for installation on a reaction chamber of an inductively coupled plasma processing apparatus and for connection to a radio frequency power source to induce an electric field for ionizing a reactant gas injected into the reaction chamber and for generating plasma, the inductively coupled antenna comprising a coil having a plurality of turns including an outermost turn and a plurality of inner turns, wherein a current flowing through the outermost turn is larger than a current flowing through the plurality of inner turns as adjusted by the capacitors, and the outermost turn and the plurality of inner turns are connected to each other at the branch point (see fig. 6 and its description).

Chen et al. is applied as above but does not expressly disclose wherein a sum of the lengths of the plurality of inner turns is longer than a length of the outermost turn. However, a prima facie case of obviousness exists because, where the only difference between the prior art and the claims was a recitation of relative dimensions of the

Art Unit: 1763

apparatus and an apparatus having the claimed relative dimensions would not perform differently than the prior art apparatus, the claimed apparatus is not patentably distinct from the prior art apparatus. Moreover, it would have been obvious to one of ordinary skill in the art to determine through routine experimentation the optimum lengths of the coils based upon a variety of factors including the desired plasma distribution and such limitation would not lend patentability to the instant application absent a showing of unexpected results.

With respect to claims 2 and 12, the outermost turn and the plurality of inner turns are connected to the RF power supply in parallel and the plurality of inner turns are connected to each other in series.

Regarding claims 4 and 14, the plurality of turns are concentrically formed.

Concerning claims 24 and 26, the configuration of the claimed coil is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed coil is significant.

Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., WO 00/00993 as applied to claims 1-2, 4, 11-12, 14, and 23-26 above, and further in view of admitted prior art.

Chen et al. is applied as above but does not expressly disclose wherein the plurality of turns is formed of a single conductive line. Admitted prior art discloses an antenna with a plurality of turns that is formed of a single conductive line (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary

Art Unit: 1763

skill in the art at the time the invention was made to modify the apparatus of Chen et al. so as to form the coils from a single conductive line because the admitted prior art shows that it is well known in the art to form a coil comprised of a plurality of turns from a single conductive line.

Claims 8-10 and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., WO 00/00993 as applied to claims 1-2, 4, 11-12, 14, and 23-26 above, and further in view of Sugai et al., U.S. Patent 5,560,776 and Ishizuka et al., U.S. Patent 5,531,834.

Chen et al. is applied as above but does not expressly disclose a conductive metal tube of copper having a cooling path, and a conductive metal strip that is electrically and thermally connected to the conductive metal tube and is coextensive with the conductive metal tube. Sugai et al. discloses a conductive metal tube 1 and a conductive metal strip 5 that is electrically and thermally connected to the conductive metal tube and is coextensive with the conductive metal tube (see figs. 1-3b and their descriptions). Furthermore, Ishizuka et al. discloses a coil that is a conductive metal tube and is composed of copper with a cooling path (see col. 6-line 57 to col. 7-line 9). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Chen et al. so as to include the coil configuration as suggested by Sugai et al. and Ishizuka et al. because such a configuration reduces contamination, produces a high frequency electric field, and allows the temperature of the coil to be carefully controlled.

Concerning claims 8 and 18, note that the apparatus of Chen et al. modified by Sugai et al. and Ishizuka et al. contains a conductive metal tube with a circular cross-section.

With respect to claims 9-10 and 19-20, the configuration of the claimed conductive metal strip is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the claimed configuration is significant. Furthermore, concerning the height of the conductive metal strip changing from a center portion to the edge portion of the antenna, such limitation represents an obvious choice of design and it would have been obvious to one of ordinary skill in the art to determine through routine experimentation the optimum height of the metal strip based upon a variety of factors including the desired inductive coupling and such limitation would not lend patentability to the instant application absent a showing of unexpected results or persuasive evidence that the claimed configuration is significant.

Response to Arguments

Applicant's arguments filed 04/30/07 have been fully considered but they are not persuasive. Applicant argues that Chen et al. does not disclose a parallel relationship between an outer coil and the plurality of inner turns of the coil. However, the examiner respectfully submits that the claimed parallel relationship is disclosed in the Chen et al. reference as described above. Furthermore, for the reasons described above, the other rejections stated above are also deemed proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

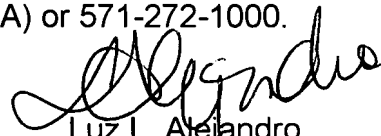
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1763

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Luz L. Alejandro
Primary Examiner
Art Unit 1763

July 23, 2007